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Promotion to a Higher Paid Job is Better than a Raise in Pay in the Present Job. Preparation for Promotion Involves Doing the Present Job Better and Showing Signs of Administrative Understanding.

Stimulating Employee Self-Improvement

By Eugene B. Mapel
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An important factor in creating satisfaction in the job itself, and therefore improvement of job performance is the continuing adjustment between the employee and his job. None of us can be satisfied when engaged in an undertaking beyond our skill and knowledge, and without satisfaction, it is difficult to perform the job functions properly. Any technique, which leads to a greater mastery of the job, and hence of job satisfaction, is of benefit to all. In this paper we will consider a technique which has proved of value in our own experience.

Job Knowledge and Job Changes

Someone has said, in essence, although the reference may be disputable, that a substantial percentage of all industrial employees who might be classified as unsatisfactory at one time possessed skill and knowledge sufficient for a given job. In a progressive economy such as ours, however, processes and techniques change, so that the knowledge of today must be adjusted and amplified to meet the condition of tomorrow. Our progress, therefore, has brought about increasing complexities requiring broader knowledge. It becomes the responsibility not only of employees, but of their supervisors, to co-operate so that the adequacy of knowledge of the job may keep pace with the changing requirements of the job.

To anticipate this situation, industry has developed training programs designed to utilize almost every conceivable training medium. Correspondence schools, trade extension classes, visual aids, vestibule schools, conference training and other mediums have all contributed their part toward the development of the workers' ability to meet increasing job requirements. Unfortunately, the use of these aids

has not furnished a completely satisfactory solution to the problem as yet, and the search for new methods and techniques must be continued.

In most industries it is not practical to provide the instruction and equipment necessary to carry out a direct training program for all employees. The essential facilities for training—that is, libraries, trained instructors, classrooms, night classes, correspondence schools, etc.—are already provided by public and private institutions created for that purpose, and those facilities are already available to most workers. Unfortunately, an insufficient number of workers take advantage of them. Therefore, the job instructor who is limited in his own facilities, by necessity or by choice, must resort to techniques which encourage the use of facilities already available, but relatively unused.

Stimulus of Practical Tests

WE BELIEVE, as a result of our experience, that a practical test, properly prepared and carefully presented, is of material aid in stimulating the desire for learning on the part of individuals subjected to it. The test referred to here should not be confused with the more familiar type of test designed for selection of employees or for measurement of knowledge. We have in mind a test designed primarily to convey information to the person who is being tested, and to stimulate him to seek further information under his own initiative.

The testing technique has been used in our own organization for three general purposes. These should be kept in mind in the ensuing consideration of our method and results. The first purpose is to stimulate discussion in conference groups; the second is to stimulate individual effort toward the development of job skills; the third is to stimulate and to direct interest in the actual performance of the job.

Increasing Supervisors' Knowledge

ONE of the most perplexing problems confronting industry during recent years has been the education of the supervisory organization in matters pertaining to company policy, to social legislation, and to the supervisory responsibilities resulting from certain acts of labor legislation. Subjects of this type are usually dealt with in conferences, but it is difficult to obtain a satisfactory conference response when the individuals have a limited knowledge of the subject matter. In some cases the discussion is of such nature that at the conclusion of a two-hour conference the conferees will be more confused than they were at the outset.

As a result of our experience with this difficulty, we have prepared questionnaires which serve to give basic information, to stimulate discussion, to direct the course of the discussion and to show each individual where further study would be most effective. They deal solely with practical problems regarding which supervisors must make decisions or give information in the course of their work. These questionnaires are of the "true and false" or "multiple choice" variety, since these

types are found to be most easily constructed and understood. The questionnaire is presented to each supervisor present at the beginning of a conference.

After the members have filled in their answers, the conference leader goes through the list of questions, discussing with the group the correct answer to each question and the underlying reasons for it. At the conclusion of the meeting the foreman or supervisor retains his copy of the questionnaire with the correct answers marked upon it, and this is to be used for his reference or further individual study. No attempt is made to score the papers, nor is there any gesture which might embarrass the individuals who have listed incorrect answers.

The questionnaire has been found to have a marked effect on the discussion in conference groups. When a supervisor answers the questions, as best he can, before the discussion begins, he enters the actual discussion with an interest which is difficult to arouse in any other manner. He is interested to find out the correctness of his own answer, and what the other supervisors think.

Labor Legislation Questions

THE following is a representative question used in a conference on Unemployment Compensation:

> In Indiana the limit of benefits which an employee can obtain in one year under the Unemployment Compensation Act is $325 ..... True, False

When the correct answer is given to the group, individuals may compare it with their own answer, and pertinent questions may be introduced for discussion. This treatment effectively conveys the required information to the conferees. Another type of question along the same line would be:

> Under the Fair Labor Standards Act it is permissible for a foreman to allow a man to work longer than forty hours a week after October 24, 1940, if the man does this work on his own time ..... True, False

Invariably, after a question of this type the conference leader has little difficulty in securing a barrage of related questions which are developed by the group and answered with the help of the group discussion.

It should also be mentioned that quite often it is desirable to use a question for which the answer is obvious for the purpose of emphasizing a particular point. Take for example the following question used in a conference on Labor Legislation:

> The safest course to follow is to give no advice at all on the union organization question ..... True, False

Questions on Company Policies

A REPRESENTATIVE question on company policy would be the following, which, it will be noticed is of the multiple choice type:

> If an employee reports for work in your department under the influence of intoxicants, you should:

1. Send him to the hospital for observation.
2. Notify the Superintendent or Supervisor of Plant Protection.
3. Ask him where he got the liquor.
4. Wait until he sobers up and then send him home.

Another question of the same type used in a similar conference would be:

If an employee is called out for work at 8:00 p.m. because of a vacancy in a position regularly filled by another employee and he works until 12 p.m., he should be paid for:

1. 4 hours' work.
2. 5 hours' work.
3. 6 hours' work.
4. 8 hours' work.

Although we believe that in our company we have a well-trained supervisory organization, numerous misconceptions of company policy are righted through the use of this test and discussion technique. This type of question, for example, can also be used to advantage in the discussion of the problems of seniority:

In department "A" there are three shears; John Jones is first helper on No. 1 shear, who due to sickness of the shearman, has acquired two weeks' experience as a shearman. Several months later a vacancy exists in the shearman's position.

First chance at the vacancy should be given to:

1. John Jones.
2. The first helper with the longest departmental service.
3. First helper with the greatest plant service.
4. The first helper with the longest service where combined factors are relatively equal.

Aids Uniformity of Interpretation

It can be readily seen how such questions on company policy, the development of correct answers to them, and the reasons therefor aid materially in obtaining uniformity, through the organization, in the interpretation and administration of rules and agreements.

It should be added that in our experience not more than ten questions if they are properly selected, should be used during a one and one-half hour conference discussion. We have found in our own plants that this type of training—a combination of test and conference—is more effective than a lecture or pure conference. The technique has been used on subjects such as "Unemployment Compensation," "Labor Legislation," "Collective Bargaining" and "Company Policy," and it is a technique which is suitable for any other topic of this type.

Increasing Job Knowledge

Another place where practical questions and tests have been found to be of great advantage is in the stimulation of tradesmen to increase their job knowledge. Tests have been found to be most useful in training maintenance men—Electricians, Pipefitters and Machinists. These workers have, in many cases, learned their trade

on the job. Their training is limited, therefore, to bare essentials necessary for the day's work, and the men are lacking in the related knowledge which will increase their effectiveness on the present job, and which will be necessary in case of transfer or promotion.

The possibilities of the trade they are in, together with the extent of knowledge necessary for advancement is most easily and effectively conveyed to the men by means of a comprehensive paper examination. It is easy, as an example, for a man who has been working on a lathe for a year or so to fall into the belief that his job is all there is to machine shop work. The test covering the entire field of machine shop practice may, and frequently does, throw a new light on the matter, and may lead the man to take advantage of adult schools, libraries and the counsel of his supervisor.

In the case of trade tests, it has been our practice to score the results and to inform the employee of his relative status among those doing similar work. This information serves as an encouragement in some cases, and as a stimulus for self-improvement in other cases. An incidental value of the test, if it is properly designed, is that it also can be used to help estimate the trade-knowledge of applicants who claim previous experience, and in many cases the test results are worthy of consideration in cases of transfer or promotion. A well constructed test can be made to serve these additional purposes without decreasing its value as a device for stimulating self-training activities.

Pipefitters' Questions

THIS sample from our Pipefitters' Questionnaire shows the type of question that we have found to be most satisfactory:

> When connecting a stabilized gas line to a natural gas line, you should always use a (1) solid connection, (2) swing joint, (3) separator, (4) emergency by-pass spool.....( )

This question was designed to inform, and to stimulate interest. The next sample (Figure I, page 321) shows a different type of question—one designed to impress upon Pipefitters the necessity of knowing the color code.

Machine Shop Questions

THE type of question illustrated (Figure II, page 321) is designed to give the "experienced" or "practical" man some advantage over the man whose knowledge is entirely theoretical. Its purpose is dual—to show that machine jobs can and must be planned, and to find out whether a man is familiar with the shop language.

Electricians' Questions

NEXT is shown a series of questions from the Electricians' Questionnaire (figure III, page 322). These questions are used to demonstrate the symbols which an electrician must know to read blueprints correctly. It has been our experience that

Materials	Colors	
1. Stabilized Gas	Aluminum	(6) ( )
2. Steam	Black	( ) ( )
3. Hot Water	Brown	( ) ( )
4. Cold Water	Bright Red	( ) ( )
5. Coke Oven Gas	Ceiling Blue	( ) ( )
6. De-oxidized Gas	Dark Purple	( ) ( )
7. Compressed Air	Dark Red	( ) ( )
8. Natural Gas	Grey	( ) ( )
9. Fuel Oil	Green	( ) ( )
10. Sulphuric Acid	Blue	( ) ( )
11. Farval Grease	Pink	( ) ( )
12. Bowser Oil	Olive green	( ) ( )
13. Gasoline	Orange	( ) ( )
14. Kemp Lines	Lavender	( ) ( )
15. Water Fire Lines	White	( ) ( )
16. Foamite	Yellow	( ) ( )
17. Hydraulic Lines		

FIGURE I

On the right is a list of colors. On the left is a list of the materials carried in pipes at this mill. You are to show how well you know the color code by matching each color with the figure or figures which you find before the appropriate materials. Mark your choice in the parentheses at the extreme right. The first one is correctly marked to show you how it should be done. There will be some colors unused; some others will be used twice.

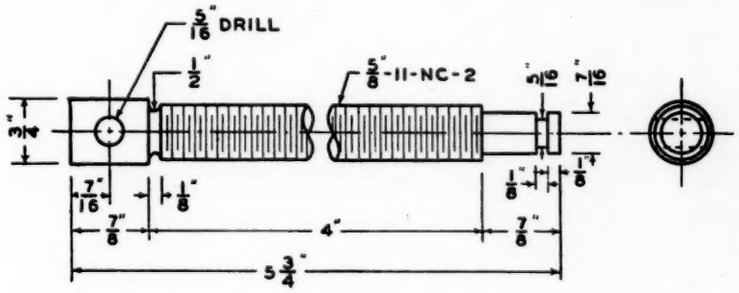


FIGURE II

The following exercises are intended to test your ability to analyze a machine job and arrange the operations in the most logical order. Study the drawings before you start to mark the statements. Indicate your choice of the four operations in each group by placing the letter preceding the operation in the parenthesis on the right hand margin. You may also underline your choice if you wish.

Part I

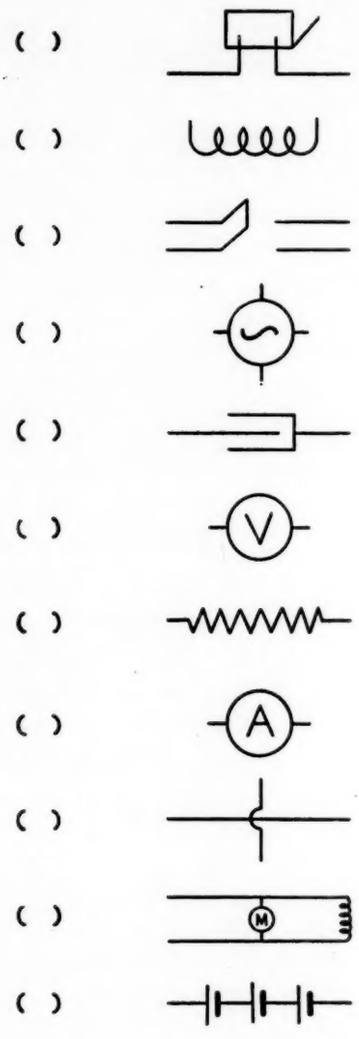
MAKING A DRILL PRESS VISE SCREW

Made from $\frac{7}{8}$" RD. bar stock

Part I. CHOICE OF OPERATIONS FOR EACH STEP

1. (a) Face in chuck, (b) face on centers, (c) layout to drill, (d) neck $\frac{1}{2}$" ( )
2. (a) Drill $\frac{5}{16}$", (b) face on centers, (c) center drill, (d) turn $\frac{3}{4}$" ( )
3. (a) Layout to drill, (b) neck $\frac{5}{16}$", (c) turn $\frac{3}{4}$", (d) turn $\frac{5}{8}$" ( )
4. (a) Turn $\frac{5}{8}$", (b) turn $\frac{7}{16}$", (c) drill $\frac{5}{16}$", (d) face on centers ( )
5. (a) Neck $\frac{5}{16}$", (b) turn $\frac{7}{16}$", (c) ream, (d) face on centers ( )
6. (a) Drill $\frac{5}{16}$", (b) chamfer, (c) ream, (d) neck $\frac{1}{2}$" ( )
7. (a) Layout to drill, (b) center drill, (c) turn threads, (d) face in chuck ( )
8. (a) Drill $\frac{5}{16}$", (b) shoulder, (c) neck $\frac{1}{2}$", (d) slot ( )
9. (a) Turn $\frac{7}{16}$", (b) chamfer, (d) neck $\frac{5}{16}$", (d) face in chuck ( )
10. (a) Layout to drill, (b) ream, (c) neck $\frac{5}{16}$", (d) shoulder ( )
11. (a) Cut threads, (b) drill $\frac{5}{16}$", (c) face in chuck, (d) shoulder ( )

many good electricians of long practice have only a limited knowledge of how systematic a blueprint is, and a question of this type is an effective device for showing



(1) ammeter
(2) battery, series cells
(3) buzzer
(4) coil
(5) condenser
(6) double pole switch
(7) lamp outlet
(8) resistance
(9) shunt motor
(10) single pole switch
(11) transformer
(12) voltmeter
(13) wires crossing
(14) series motor

FIGURE III

In the following section of this test a number of symbols which are commonly used to represent various parts of electric circuits are placed in the left-hand column, with parentheses to their left. In the right-hand column are the names of a number of electrical devices, arranged in alphabetical order. Place the number of the name in the parenthesis before the symbol which is used to represent it. There are more names than symbols; so all of the latter will not be used.

what should be known and what can be learned easily with a little self-directed effort on the part of the employee.

The trade tests now in use in our plants have a large number of questions covering their respective fields thoroughly. The questions are graded in difficulty so

that by retesting, a measure of progress in learning can be had. This feature has been particularly useful in connection with the apprentice classes. The tests are presented to employees as a guide to what they ought to know about their trade, and since it is not practical to convey the material directly we thereby stimulate them to learn through other channels. May I mention that an increase of more than 200 per cent has been noted in the enrollment of adult trade classes in the fields where the testing technique was used. This, we believe, is sufficient evidence of the value of testing technique as a stimulus to learning.

Job Performance Tests

A THIRD type of test used as part of the training program is one designed directly to stimulate effective performance on the job. As an illustration of this technique, we will describe a test prepared and used in the Plant Protection Department. In an organization as large as ours it is difficult for a plant watchman to recognize many of the supervisors whom he should know upon sight. To direct attention towards deficiencies in this respect and to help eliminate the deficiencies, a recognition test was prepared.

Photographs of a large number of supervisors were thrown upon a screen and the Plant Protection men were asked to identify the photographs and record the name of the man photographed, his position and the location of his office. A retest some ninety days later showed a great improvement over the scores on the first test, due, no doubt, to the stimulus of the testing technique. The test was surprisingly effective in some cases, for supervisors reported that they had been approached by Plant Protection employees who wished to be informed about their name, position and office location. Incidentally, the men enjoyed taking the test and a noticeable improvement in job interest was in evidence. In this case a simple test proved of great value in stimulating better performance on the job.

Improving Detection of Defects

ONE more illustrative case will suffice to show how the testing technique can be used to improve job performance. This test was devised to improve the performance of the assorting-room girls. These girls inspect the tinplate just before it is shipped to the customer, and since this is the final inspection, the work must be done with great care. These girls must be sufficiently alert to detect all of the many different kinds of defects which may occur in tinplate. Their performance on this difficult job has been of a uniformly high order; however, it was determined that even greater emphasis should be placed on the detection of a certain defect of greater importance and more elusive than the others.

To improve their inspection in this regard the testing technique was brought into use, by the simple expedient of preparing a dummy test stack of selected sheets and asking each girl to assort the stack, paying particular attention to the defect in

question. The girls gave their full co-operation and the device had its intended effect, for there was an immediately noticeable increase of attention given by the girls toward improving their performance in the manner suggested by the test. We believe that this simple test was more effective in helping the assorting-room girls improve their work than any amount of verbal advice or instruction.

In conclusion may we summarize what has been said concerning the test as a stimulus to learning in industry. In the training program at our plant, we have used tests in this manner for over two years. Three general types of tests have been devised, each adapted to a special course—the test to stimulate conference discussion; the test to stimulate the use of outside training facilities; and the test to stimulate increased effectiveness on the job. These tests have demonstrated their value to our satisfaction.

Some of you may be wondering what the workers themselves think of these tests. It has been our experience that very few men object to taking a test, and that most of them approach it with an interest which is most gratifying. Perhaps the prevalence of the radio quiz program has led them to a blind acceptance of all tests, but we prefer to believe that the workers accept the tests in the same spirit as they are offered—an attempt to improve their job performance and their job satisfaction.

This paper was presented at the last meeting of the Texas Personnel Conference, University of Texas.

WANTED

Back Numbers of the *Personnel Journal.*

Libraries and industrial companies have sent in orders for back numbers of the Personnel Journal for reference and to complete their files. The following numbers are out of print:

Volume	*Number*	*Month*	*Year*
6	10	April	1928
14	3, 4 and 5	Sept. Oct. & Nov.	1935
17	3	Sept.	1938

We should be obliged if those having copies of these numbers, which they no longer require, would return them to us. Full price will be paid for copies so sent in. They should be addressed to, Circulation Manager, Personnel Journal, 60 East 42nd Street, New York, N.Y.

Through the Suitable Application of Psychological Tests, Cases are on Record Showing: Reductions in Defects, Decreases in Production Times, Less Labor Turnover, Fewer Accidents, Better Use of School and College Time and More Appropriate Selection of Jobs by Students.

Psychological Tests *in* Industry *and* Education

By L. R. Palmerston
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Although psychological testing is now several decades old, few personnel men or the general public seem to appreciate the significance of the movement, or to understand its advantages and limitations. Too often articles which reach the reader are extremely biased and one-sided, presenting a strong case either for or against the movement. Enthusiastic psychologists and journalists have described the mental test as a cure-all, and have penned such phrases as "uncanny accuracy", "amazing predictions", and "fool-proof formulas." Others have engaged in severe criticism of the whole or parts of testing procedure, protesting against abuses, and exposing faults in technique and flaws in interpretation.

Science Is Young

The mental testers themselves have been amused and at times a bit alarmed at the one-sided comment concerning their efforts, but in general they have welcomed discussion of psychological tests and techniques. They contend that the movement has many worthy achievements to its credit, but at the same time they acknowledge that constructive criticism is stimulating to a science as young as it is. With these considerations in mind the present writer, himself an enthusiastic but critical mental tester, will attempt to explain briefly the problems in which the movement was conceived, the basic principles upon which it rests, the methods now used, and the results of the application of such techniques to personnel and guidance problems.

Mental tests were developed as a partial answer to human problems. Industrial personnel departments, feeling somewhat the inadequacy of traditional methods of traditional methods of selecting workers, have tried to solve their problem by search-

ing for improved methods. Society in general sees the problem of unemployment and relief—the industrial misfit, the maladjusted worker, the "twisted" personality, and the social and economic misfit—as perhaps the social problem, not only of depression but also of so-called normal times.

Binet, famous for his achievements in intelligence testing, faced the difficult problem of detecting mentally handicapped children in France. At the time of America's entrance into the World War, army officials and army psychologists were confronted by the problem of utilizing quickly and efficiently untrained recruits. The American school system, awakened in recent decades to the great range of individual differences in American school children, has attempted to meet the problem of providing for individual needs by offering varied curricula. American colleges have been uneasy concerning the problems of student mortality, unwise vocational objectives, wasted talents, and neglected opportunities. Mental tests were developed as a partial answer to human problems such as these.

Psychology, like other sciences, is constantly revising its hypotheses and testing its generalizations, but it does profess to have certain basic assumptions upon which it builds and validates its techniques. Let us examine several of these principles.

The Biological Curve

First is the fact that *human traits are distributed according to a dependable and uniform pattern*, commonly called the normal frequency curve, normal probability curve, or biological curve. Again and again it has been observed that physical and mental characteristics, and moral and personality traits, are so distributed among the human race that most people are found close to the group average, with fewer and fewer toward the upper and lower extremes. Most of us are about average in height, weight, intelligence, honesty, extroversion-introversion, etc.; a few of us are very tall or very short, very fat or very thin, geniuses or idiots, uniforms honest or dishonest, extreme extroverts or introverts. Here we find one of the dependable sequences scientists talk about, one of the dependable sequences of psychology.

Everyone Has Some Strong Point

In the second place, we observe that *these traits may assume strikingly different combinations in different individuals*. It is probably true, as Viteles[8] points out, that most of an individual's traits are closely packed around the average of his traits, with a few strong and a few weak traits further removed from this central tendency (the normal curve again); but it is true also that every individual pattern of characteristics is in some respects unique. Cutting clear of heavy psychological theory and controversies involving general and specific factors as developed by Spearman and Thorndike, we are justified in another well established generalization: *weakness in one trait or several traits does not mean weakness in all traits, and strength in one or more*

traits does not mean strength in all traits. In other words every individual probably possesses some aptitudes or capacities in which he stands above average, and some traits in which he stands below average in comparison with his fellow men.

Personnel men and vocational counselors have seized the concept derived from this second generalization, and have embodied it in a most encouraging philosophy. It means, if we are patient, if we dig far enough into human personality, and if we apply proper techniques, that talents can be discovered and abilities can be tapped and developed, in the ordinary worker in industry and student in school to make him a better vocational prospect and a better member of society. It may be advisable to build up some of his weaknesses, but above all he should be encouraged to capitalize on his strong traits.

How Much Does He Have?

THE third generalization, which follows logically after the first and second, states that *these differences which we observe in people are after all differences in degree rather than differences in kind*, differences in quantity rather than quality. It is not so important to find out whether John Smith possesses this trait or that (no doubt he does, in some degree); it is of great importance to learn how much of this trait he displays in comparison with his fellows. After all the difference between a bookkeeper and an accountant, for example, or between a mechanic and an engineer, is chiefly one of degree, not of kind.

Probabilities of Sciences

A FOURTH generalization is to this effect: *All psychological generalizations must be expressed in terms of probability, not certainty.* All sciences dealing with man must surround their predictions with allowance for error. We can rely upon the law of large numbers, but we cannot predict with certainty the behavior of a certain individual. We know how many men age 40 will die this year, but we do not know who the unfortunate members of that group will be. Statisticians can calculate closely the number of marriages, births, suicides, or automobile accidents per 1000 for 1941; but they cannot pull individuals out of the masses of data themselves.

Of course John Smith's doctor may diagnose his case individually and tell him that his chances are only 1 out of 10 unless he makes certain changes in his mode of living. Again he may tell a patient that his chances of surviving an operation are 98 in 100; he may predict that a pneumonia patient's chances of recovery are perhaps 94 out of 100[2] if sulfanilamide is administered, whereas they would be 75 out of 100 without the new drug. Similarly we personnel men in industry and education are assembling our probabilities and our predictions. We are now able to say that a job applicant A with a certain psychological test score has a 75 per cent chance of being successful, whereas B with a certain lower score has only a 40 per cent chance. And we can predict, on the basis of college entrance ratings, a freshman's chances of

achieving satisfactory scholarship. Furthermore we are able to differentiate between fields from which this freshman may choose; he may be a poor prospect for dentistry but a strong prospect for engineering. And the freshman co-ed may prove to be a splendid candidate for office and secretarial work but a poor risk for nursing.

Psychologists constantly point out also that their statements of probability must be revised frequently. It may not be necessary, as one writer suggests, to date every psychological generalization, but it is the established policy of psychological science to check and recheck, revise and revise again, its statements of probability.

Much Better than Hunches

A FIFTH generalization follows from the others. Psychologists feel that *any psychological test or refinement in technique which is superior to the traditional methods of judging people*, i.e. hunches, intuitions, snap judgments, etc., *is worth while*. The literature of psychology is packed with evidence which shows that these methods and the pseudo-scientific methods of character analysis, phrenology, physiognomy, etc. are in most cases no better than chance. If a psychological test proves to be 20, 50, 90 percent better than chance, psychologists want such an instrument, and they intend to use it while they attempt to perfect a better one.

How the Psychologist Works

BACKED up by such a set of principles, psychologists set to work on these human problems to which we have referred. Their purpose is to develop short-cuts, labor-saving devices to reduce human waste and facilitate human adjustment in the factory, the office, the home, and the school.

How does the psychologist proceed? He selects samples of human behavior, tasks to perform, responses to record—items which differentiate between individuals. It is not sufficient that an instrument throws individuals into two or perhaps three classes or types, or that a test selects or rejects. It must reveal different *degrees* of ability, aptitude, achievement, or interest.

Now the selection of such test items is a painstaking process which requires rigid elimination of useless (undifferentiating) items and careful standardization, statistical evaluation, and calibration of the items retained. As a recent writer says, a good test is a product of "patient verification of facts, a remorseless checking of hypotheses, an insistence that every generalization be well-founded."[3]

Furthermore the psychologist does not claim that his test measures the ability or trait in question directly. He measures intelligence, as the engineer measures electricity, by what it does. When he assembles items which differentiate between known cases of mental deficiency and genius, more than that, between degrees of ability, he says he is getting at general intelligence. When he gathers items which distinguish clearly between good, fair, and poor stenographers and clerical workers, he says he is trying to measure clerical aptitude. When he finds a technique which sharply distinguishes between successful and unsuccessful substation operators, in

fact does a better job of selection than a personal interview or letter of application, he cautiously states that he is tapping the ability required to do this type of work. When he finds items which clearly distinguish between successful and unsuccessful nurses, he may for want of a better term call his instrument a test of nursing aptitude.

Similarly he has developed in the last 30 years various tests of achievement, general aptitude, special aptitude, interest, and personality. He may be pardoned for calling these tests measuring instruments, and speaking sometimes as if he were measuring the trait or quality directly. Actually he knows that he merely taps a sample of behavior, uses a selection of responses. He is justified in carrying on his work, because his efforts have piled up a mass of evidence which cannot be ignored.

Tests Supplement Good Judgment

We must admit frankly, however, that many bad tests have been placed upon the market. Several recent articles have exposed examples of some of the worst. Many cases of shoddy, unscientific work can be cited. But we must not assume, as one writer, that all of the good work was done by Binet and his followers in the field of general intelligence. Brilliant work has been submitted from numerous sources in the fields of achievement, special aptitude, and interest; and significant beginnings have been made in the field of personality measurement.

Research in recent years has been especially fruitful, because actual calibration and standardization have been based upon huge samples of the population, available now from our recent advances in machine scoring and statistical technique, and with the cooperation of an army of psychologists and personnel administrators in industry and the schools.

Of course the layman, as well as the psychologist, must realize that even a good instrument can be a dangerous tool in the wrong hands. Many so-called mental testers have violated standardized procedure, have claimed uncanny accuracy, have made amazing predictions, have broadcast shaky generalizations, and have been guilty of questionable interpretations. Psychology and the mental testing movement, like astronomy, physics, and chemistry, have had some very undesirable in-laws.

We must learn that tests merely provide more refined statements of probability, not statements of certainty as some pseudo-psychologists would have us believe. We must constantly remind ourselves that the tests do not decide, they merely provide a valuable supplement to good judgment and subjective evaluation.

Strong's Vocational Interest Test

Let us now examine the credentials of some of our best tests to see if they measure what they purport to measure, or, as the psychologists would express it, let us check the validity of these instruments. Let us call these tests by name and refer to samples of the literature on testing.

Professor Strong's *Vocational Interest Blank* may serve as a starting place. This blank has been employed for more than ten years. It has been revised recently and is now arranged for machine scoring. Separate forms are provided for men and for women. As now assembled, the blank provides approximately 400 items concerning occupations, amusements, school subjects, activities, peculiarities of people, and estimates of present abilities and characteristics. Subjects are to indicate whether they would like, dislike, or be indifferent to each item. There are no right or wrong responses. A high score is no better than a low score, an "A" rating in no way superior to a "C" rating. The test, as we mental testers call it, is not a test of aptitude, not a test of ability, nor does it tell the proper choice of vocation.

By means of thorough calibration and standardization that would challenge even the work of Binet, Professor Strong has provided a measuring stick for vocational interest. No, not directly. The test does not show directly that John would be interested in engineering, or law, or office work, or selling. It merely compares the degree to which John's interest pattern on the 400 items agrees with the interest pattern of successful men in each of some 30 occupations. Professor Strong has evidence[4, 5] to show that most members of a profession (and he has picked large, representative samples of successful persons) tend to express the same patterns of preferences on these 400 items, although some occupational groups have more heterogeneous interests than others.

Results with Engineers

But how valid is the test? Here are samples of the evidence[4, 5, 6] which is being accumulated. For example, of a group of over 500 engineers, 75 percent rated A, 23 percent B, and 2 percent C for engineering. On the other hand, 15 percent of a group of 900 non-engineers rated A for engineering, but most of the 15 percent were engaged in vocations related to engineering. Here then are the marked differences which a good test must provide. Another study shows that "whereas 63 percent of a group of non-law seniors rated C as lawyer, only 15 percent of the law majors rated C, and none of this latter group was planning to enter law."[4, 5]

Professor Strong has evidence to show that "(1) men continuing in an occupation obtain a higher interest score in it than in any other occupation, (2) men continuing in an occupation obtain a higher interest score in it than men entering some other occupation, (3) men continuing in an occupation obtain higher scores in it than men who change from that occupation to some other, (4) men changing from some other occupation to occupation 'A' score higher in 'A' prior to the change than they did in other occupations."[5]

And still more evidence[6], this time for women: of 500 married women, none rated as high for physician as the average woman physician, and 66 percent of these married women scored lower than the physician with the lowest score.

And in the field of selling[5]: of 181 life insurance agents 105 rated A for selling

and 16 C. Furthermore 67 percent of the insurance agents with A ratings sold $150,000 or more business a year, whereas only 6 percent of the C men reached this figure; and 39 percent of the A men sold over $200,000 of insurance annually, whereas none of the C men reached this figure. It is not surprising that life insurance companies are impressed with the differential factor of the *Strong Vocational Interest Blank*.

How Personnel Men Use It

But how does a personnel man use this interest test for hiring or guidance purposes? Again we must suggest thinking in terms of probabilities rather than certainties, and we must remember also that interests, like other personality traits, do change, especially between the ages of 15 and 25. With these qualifications in mind, it may be asserted that a young man or woman should find satisfaction in that occupational field or combination of fields in which he has A or B-plus interest rattings, provided of course he has also the required ability. The personnel man may safely advise job applicants or students that they should not enter occupations in which they have B– or C ratings unless "they are definitely assured that their other assets are sufficiently strong to counteract the fact that they do not resemble in interests persons engaged in the occupation."[4]

Considerable space has been given to the Strong Blank because it is frequently misused, misunderstood, and criticized. Let us now examine briefly a good test of general aptitude and several tests of special aptitude. We can pick out only a few of the best ones. There are many others of equal merit (as well as the numerous unscientific tests of questionable reliability and validity—tests which have no place in a testing program).

Test for Rapid Hand Work

Among the best *Dexterity Tests* are the *Finger Dexterity Test* and the *Tweezer Dexterity Test*, developed by Johnson O'Connor. They are a part of the test battery employed in *The Human Engineering Laboratory* at Stevens Institute of Technology and Armour Institute of Technology. The tests require the subject to fit small metal pegs into holes in a metal board, with the fingers or with a tweezer. Do the tests really measure dexterity? Dr. O'Connor is very cautious in his claims, and he insists that a great amount of research remains to be done on these techniques; but he would probably permit us to say that the tests do differentiate between occupational groups, although "there are wide variations within some of these occupational groups."[4]

It seems safe to assert that the finger dexterity test taps a type of ability needed in occupations requiring rapid hand work with small objects, and that the tweezer dexterity test samples activities analogous to those employed by workers who use fine instruments.[4] One study may be mentioned: ". . . 36 women applicants were

interviewed, rated, tested, and hired for factory assembly work. Of those whose scores were in the lowest quartile, 36 percent terminated their employment before 8 months of service, while only 6 percent of those in the highest quartile left during the same interval. Over 50 percent of those who had been rated 'A' by interviewers left the concern in this time."[4]

Test for Clerical Workers

THE *Minnesota Vocational Test for Clerical Workers* is a speed test in which the subject rapidly checks off pairs of numbers of names, indicating whether or not they are the same. To summarize numerous studies, we may say that the authors (1) have evidence to show that the test has a high degree of reliability, differentiates sharply between employed clerical workers and workers in general, and predicts significantly success in commercial training and on the job. Furthermore the test seems to measure aptitude, not training, because training does not appear to improve test scores. And finally this aptitude seems unique, because the test does not show a significant relation to general intelligence.

Test for Nurses

THE *Aptitude Test For Nursing*, developed by F. A. Moss and T. Hunt, has been used for several years by numerous hospitals and testing bureaus. The test can be administered in less than an hour. It consists of "seven parts, dealing with scientific vocabulary, general information, understanding of printed material, visual memory, memory for content, comprehension and retention, and ability to understand and follow directions" (4).

Does the test differentiate between successful and unsuccessful nurses? A report of a study (7) of 500 nurses in 12 hospitals provides a partial answer to this question. The tabulations show that of those who scored below 60 on the test, 29 per cent received grades in academic work and 80 percent received grades in practical nursing of 85 or higher. The data indicate also that none whose scores on the test were in the upper half failed in either academic work or practical nursing, but on the other hand only 7 percent of those who scored below 60 failed. Such differentials, although suggestive and usable in guidance, are not entirely satisfactory, of course.

This particular problem is complicated by the probable lack of validity of teachers' grades and the possibility that standards are not sufficiently high in some of our nursing schools. Such inconclusive evidence illustrates the difficulty at times in validating an instrument when the validating criterion itself may be subject to error, and it suggests that extreme caution must be used in making interpretations.

Test for Students

THE *American Council Psychological Examination* is representative of the best tests of general aptitude or intelligence. A new form is prepared each year by the Thurstons of the University of Chicago, and is published by the American Council

on Education. In recent years the examination has been used as a part of a battery of entrance tests by several hundred colleges. Combined with high school grades or high school rank, it provides a valid basis for predicting scholastic success on the college level.

It is possible, for example, to convert high school ranks and test scores into percentiles ranging from 0 to 100, which can be combined as a College Aptitude Rating. The validity of such ratings is now well established by numerous studies. For example, a recent study by the writer indicates that 87 percent of students with C.A.R.'s (College Aptitude Ratings) between 76 and 100, 62.5 percent with C.A.R.'s 51 to 75, 21 percent with C.A.R.'s 26 to 50, and 0 percent with C.A.R.'s below 25 made C or better averages in their first semester in an engineering college. These probabilities are based upon comparatively small numbers of cases, but they have remained relatively constant for two years. Such findings suggest the need of pre-college guidance and revised educational and vocational goals for many students.

Many other examples of psychological tests could be mentioned. Enough evidence has been presented to suggest that significant progress has been made in the fields of general aptitude, special aptitude, and interest. Many good trade tests have been developed also for industrial and vocational uses. Notable contributions have been made in the field of achievement testing—mention should be made of the excellent work of the Cooperative Test Service. Efforts to test personality and character traits are still in the pioneer stage, however. Although notable progress is now evident, it is probable that in this field another major contribution like Binet's in intelligence testing, still lies in the future.

Selected List of Industrial Results

And now a word concerning "the follow-up" of this testing procedure. After these tests have been applied to the solution of our problems, what are the outcomes? Space permits us to mention but a few of the findings. First we shall list several industrial applications, most of which have been summarized by Viteles (8, 9). These are results which have followed after psychological methods were put into operation:

1. A 35 percent reduction in 3 years in the number of operating errors charged against electric substation operators.
2. An 11.6 percent decrease in production time and a 14.3 increase in quality for metal trade apprentices.
3. A lower proportion of labor turnover among metal trade apprentices with high scores than among those with low scores.
4. Reduction of labor turnover from 55 to 10 percent among cigarette packers.
5. Reduction of labor turnover among foundry workers from 11.7 to 2.9 percent in 5 years.
6. Reduction of labor turnover from 25 to 15 percent in an English textile mill, and from 50 to 12.5 percent in a Dutch lamp manufacturing plant.
7. Among motormen a reduction from 14 to 0.6 percent in the number of men discharged because of accidents.

8. An annual saving of 150,000 francs in training, and a saving of 1,300,000 francs in reduced accidents, resulting from improved selection of autobus operators in Paris.
9. A rapid and continuous drop in accidents in a taxicab company.
10. An increase in the average number of miles between accidents from approximately 12,000 to over 56,000 miles in six years, for a company operating a fleet of trucks and passenger cars.
11. A prediction that 93 percent of mail distributors selected by the Civil Service Commission from the upper 25 percent on the basis of test scores will be above average on the job.
12. A Civil Service study showing that 99 percent of those rating in the highest 25 percent were above average in efficiency, whereas 96 percent of those in the lowest 25 percent were below average in efficiency.

Those industrial applications are perhaps more striking than the results recorded in school testing bureaus. But analyses of case summaries, individual profiles, and follow-up studies of the high school or college counselor are equally convincing, although they frequently fail to show in tangible form percentages of saving or lowering of unit cost. We can assert with confidence, however, that the efforts of counseling services, testing bureaus, Human Engineering Laboratories, guidance clinics, etc. have helped thousands of young men and women to make superior occupational and educational adjustments.

Results in Schools

WE EDUCATIONAL counselors have compared college grades before and after counseling, and we find significant improvement for many of those who have followed the recommendations offered. We have made prediction studies, comparing predicted with actual scholarship, and have found close agreement; for example, a recent study by the writer indicates that actual college scholarship varied from predicted scholarship by more than one letter grade in only eight percent of the cases. But, of course, we find little satisfaction in predicting failure, as we have been forced to do at times, because our objective is the optimum adjustment of each student.

We have recorded and classified various personality problems which our students have brought to us, and we have tried to diagnose them and applied such remedial measures as were available; and we find in our files many, many case histories which show distinct improvement. We have begun more extended follow-up studies, checking progress on through training and out beyond into business, professional, and industrial life; and here too our results are encouraging, but not yet conclusive, because our techniques are new, and much research remains to be done.

Future Applications

THUS the evidence is accumulating year by year. Yes, the mental testers think they have something. We who are cautious make no extravagant claims, none of this talk of uncanny accuracy, no spectacular findings. But we do insist

that we have in our hands a new and better set of tools needed to supplement old techniques. As we continue to improve our methods, to re-examine our criteria, to search for better differentiating symptoms, we shall use the best psychological instruments available, as a means of fitting men and women and jobs, an approach to the problem of labor turnover and accident proneness, a technique for relieving at least part of the maladjustment of the industrial misfit, a device to be employed in lowering unit costs of production, and a method of attack on students' problems in our schools and colleges, with possibilities of enormous saving to society in the form of increased efficiency and a greater volume of goods and services, with a greater degree of human satisfaction.

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Many Employers Wonder Just What is on Their Workers' Minds—Not the Big Problems which Break Out Occasionally, like Spontaneous Combustion in Violent Strikes, but the Small Smoldering Tinder which Continually Threatens, if not Extinguished, to Burst into Flames.

Requests *and* Complaints *of* Unionized Workers

A Case Study By FRANK T. DE VYVER
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MINOR requests and complaints of workers seldom receive any publicity, for they are not spectacular. There is seldom any record kept of them. Personnel managers know in general the type of problem which irritates workers, but there is little knowledge of details.

It is fortunate therefore, that the chief executive of a large southern textile mill decided to keep a written record of requests and complaints made by the unionized workers in his mill.

Seniority Problems Most Frequent

AN EXAMINATION of four hundred and forty-seven requests and complaints made over a fifteen month period in this southern textile mill indicates several important facts. As summarized in Table I (page 337) seniority questions accounted for the largest number of these written requests for investigations. If the employment records of the mill had been kept according to best personnel practices, most of these complaints need never have been made. Second and third in importance were disputes over persons or over working conditions. Of small importance, as a result of the union agreement, were disputes over wage rates.

In the second place, all of these matters were settled at least to the satisfaction of the appropriate shop committee. Sometimes the settlement merely involved a detailed explanation; most often the request was granted; occasionally the request was refused. In such cases, however, the decision was never couched in arbitrary terms, but a reasonable explanation was given. In other words, the management of the mill had no trouble with arbitrary demands backed by arbitrary threats. Both the union and the management tried to cooperate.

Lastly, it should be pointed out that many of the complaints against persons were made against petty bosses such as second hands and section men. Apparently the workers found in general that the superintendent and higher officials tried to "go down the line" with them. Their immediate bosses occasionally could not remember that union-management cooperation required a different technique than that required under the "führer" system.

There is no way of knowing whether any of these amicably settled disputes would have led to more universal discord had they not been settled, but certainly little things frequently cause serious labor unrest. Union-management cooperation, though it takes more time and patience than dictatorial decisions from above, makes

TABLE I

A Summary of 447 Requests and Complaints Made by Workers in a Southern Textile Mill, Classified by Apparent Subject

SUBJECTS	NUMBER	
Seniority and Jobs		
Requests for exchanging jobs	27	
Seniority disputes with others	65	
Asking for new openings	126	
Total		218
Suggestions and Cooperation		55
Complaints Against Individuals		
Minor officials	15	
Workers concerning work	24	
Workers for personal reasons	24	
Total		63
Infringement of Working Rules		25
Wages		25
Working Conditions		61
Total Recorded Requests and Complaints		447

for better understanding, by both men and employers, of the minor irritants that arise in any plant.

Strike Aftermath

This mill, located in the deep South, had until a few years ago no relations with organized labor. With the expansion of unionism following the passage of the N. I. R. A., the workers in this mill were organized, and in 1935 joined with thousands of other textile workers in the general textile strike of that year. Although the management refused to enter into a collective bargaining agreement, there was a written agreement ending the strike. One of the sections provided that all complaints should be made in writing, and should be put on record, along with the response of the appropriate shop committee and of the management.

Simple Settlement in Most Cases

DURING a fifteen month period studied four hundred and forty-seven requests and complaints were filed with the management. An analysis of these offers evidence of the type of friction which often makes for sulky, dissatisfied workers. A study of the action of the management with respect to each indicates how simply most disputes may be settled, though they loom large to the individual employee.

(Note. For obvious reasons the name of the mill is withheld as well as too many definite hints which might enable it to be spotted. All names used are fictitious. All data, however, were copied from the original complaint sheets and in many cases the original language and spelling has been retained. Profanity, which was widely scattered through the original documents, has been deleted.)

This is not, however, an attempt to outline a history of labor relations in the particular mill from which these examples were taken. The growing pains of collective bargaining in a southern mill, where ten years ago the very name "union" was anathema, would make, certainly, an interesting study. We are here concerned not with the development of collective bargaining but with the type of request and complaint made by workers given the chance, as they apparently were, for free and open discussion.

The matters brought up by workers have been classified according to subject. Such a plan has, to be sure, sometimes necessitated arbitrary classification since actual motives may be different from those expressed, or since a complaint might conceivably be placed in two or more categories.

Most numerous among letters were those relating to seniority or requesting specific jobs. Of the 447 letters 218 asked whether A or B should have a particular opening, whether B and C might exchange jobs, or whether D might have first place on the extra board. In reality many of the letters in this group could be called requests rather than complaints, though occasionally one senses a trace of bitterness in the illiterate words.

Property Rights in Job

THE agreement ending the strike in 1935 laid down certain general rules with reference to seniority and lines of promotion. In the first place a man's job was his property so long as he did his work efficiently. He could not, however, dispose of it to another, though he might exchange it with a friend for the latter's job if the exchange were satisfactory to the appropriate shop committees and to the management. In such cases seniority rights were lost by both parties.

The agreement further provided that in the event of an opening those eligible to fill it would have ten days to apply, at the end of which time the job would be given to the applicant with the oldest service record, or if there were no applicants, to the person whom the overseer might select. With forethought many workers sought to establish their seniority rights in anticipation of future openings.

Requests for permission to exchange jobs accounted for only twenty-seven of

these matters involving seniority. In some cases no reason was given for the exchange; in others workers exchanged so that each could make more money or because of mutual preference for the other's shift. In each case the request was granted.

Job Change to Improve Health

One of the more interesting examples of this type of request was that of Jennie B. Barker, a frame hand, who asked to change jobs with Tom Yorke, a doffer. "Through Legal Procedure," she wrote, "I want to change Jobs with tom Yorke a doffer on dayrun for a period of 6 weeks to see if my health will Improve I know if I am allowed to change jobs I will not make as much But I will be willing to change anyway Mr. Yorke will make more on my Frames than he does Doffing. I have talked to tom Yorke and the change is O.K. with him for 6 weeks I would like to change Monday." This request was endorsed by the two shop committees involved and approved by the overseer.

True seniority questions were of two types. In sixty-five cases workers disputed their seniority rights with others and in one hundred and twenty-six instances workers merely asked for new openings, or for a chance at the next opening on the basis of their own acknowledged seniority rights.

When two workers were involved the management made the final decision. Sam Gordan, for example, "Through Legal procedure" filed a complaint saying that he had seniority rights over W. H. Fraylor as "extra fixer or section man." Feeling, he said, that his experience gave him rights over the other man he referred his complaints to the the Committee to be settled. In this instance the complaint was carried no further than the appropriate shop committee which decided that Traylor should keep his seniority rights over Gordon. Included as part of the committee's record was the testimony of several people upholding Gordon's claim.

Did He Quit or Was He Fired?

Apparently seniority in this and many similar cases rested upon the claimant's status during sporadic periods of unemployment in his work history. Under such circumstances the committees and the management had to decide whether a worker had quit, had been fired, or had merely been laid off due to lack of work. Employment records in Southern mills have not always been of the best.

In by far the larger number of seniority cases, however, the workers had no quarrel with other workers or with the management; they merely wished to record their claim or make a routine request for a transfer. Many workers, for example, filed complaints similar to that of Sadie Lowder who wrote: "May I make application for first opening as doffer. Thanks in the future for your consideration."

To such request, endorsed by the appropriate shop committee, the management invariably agreed. "Lowder is a capable doffer," read the answer to this particular note, "and it is hereby agreed that she is to get the next doffing job that comes open to which her seniority entitles her."

"I Would Like to Go to School"

OTHER employees, like Jeannette Carstairs, merely wished for various reasons to change shifts. Miss Carstairs wrote, "I would like to change to the second shift, as I would like to go to school, if it is satisfaction with you." Ordinarily in such cases, the shop committee approved the request and the management agreed to make the change as soon as possible.

Occasionally, to be sure, the shop committees and the superintendent were unable to grant such requests. Refusals, however, usually involved situations in which the complainant had been misinformed with respect to his seniority or the existence of an opening. Miss Ohlheim applied, for instance, for two sides (spinning) formerly run by a Mrs. Merrifield. The request had to be denied because Mrs. Merrifield had not given up her job permanently.

Cooperative Suggestions

A SECOND general group of letters can be classified as suggestions to the management or attempts at union-management cooperation. Many companies have long used a plan of paying workers for suggestions found valuable to the company, and the "new unionism" provides for union-management cooperation to increase marginal productivity of the working force.

The fifty-five letters in this group offer a variety of suggestions for improving details in a single department as well as for general mill management. That in many instances these suggestions were aimed at lessening the employees' work does not detract from the fact that in nearly all cases the management apparently appreciated the idea involved, and at least took the matter under advisement. When suggestions could not be followed, the management, through the overseer or superintendent, gave detailed explanations. Such practices with respect to suggestions undoubtedly created better feeling among the workers involved.

Of interest as an example of a suggestion to increase production was one made by the shop committee of the warp room which recommended "that spinners and doffers have their work arranged so that a spinner or doffer will have their jobs on either two lines of frames either side of the Big Alley. This will stop them from working all the way across the Room and from crossing the Big Alley." In accepting this recommendation the overseer remarked that it showed a splendid spirit of cooperation in the department organization.

Coordination to Increase Production and Wages

IN ANOTHER instance the shop committee directed the attention of the management to a lack of coordination between two units of the plant. The speeder machines in number one card room were waiting for bobbins while a surplus of the same type of bobbins accumulated in the card room of number two mill. The superintendent

arranged to have the surplus bobbins sent to the number one mill. The suggestion not only permitted the piece-paid speeders to earn more but also aided the management by increasing production.

Three instances may be cited in which workers asked for improvements not connected with actual production. One shop committee asked that the swinging windows be fixed for, they said, "it has got dangerous to get around one Wen the wind is Blowing and thair has been Sevrel People hurt by them and thair ant Been nothin done yet about fixin them." They were asking this, they concluded, "Before some one gets killed and then it will bee to late and it is a Big Damage to the Company like it is."

Improving Working Conditions

ANOTHER group in the same spinning room asked for dressing rooms for both men and women. "We can't hang our clothes in the hydran room they get wet," they said, and concluded that they would appreciate the management's attending to the matter. The management said they would take the problem under advisement. Workers in the same room complained about the toilets: "The Hydrans," they declared, "have been neglected they are not scrubed as often as they should be there is not enough Ventilation in an around the hydrans. The water pipes are bursted keeping the floor standing in water all the time." The management promised to ventilate the toilets.

To be sure, none of these fifty-five letters brought anything of great importance to the management's attention. Nevertheless, to the workers making the suggestions the ideas were important.

As might be expected, a number of complaints were filed against individuals. These may be divided into three classifications: complaints against minor officials, complaints against workers who the shop committees felt were not doing their work properly, and personal complaints against fellow workers. Occasionally internal evidence reveals that the complainant bore a grudge against the defendant, or that a union member found a non-unionist particularly liable to censure. Usually, however, the complaint being worded in general terms, such personal vehemence is not apparent.

Complaints against Supervisors

THE fifteen complaints filed against overseers and second hands illustrate the statement made by an official of another mill in the same city that the hardest part of dealing with a trade union after years of individual bargaining is to get minor officials to deal tactfully wirh workers. "A man," he said, "who has been used to having his word obeyed, no matter how dictatorially that word was said, finds difficulty in adjustment to a new order." (Verbal statement to author.)

Mr. Ranell, a second hand in the cloth room, lost his job because of the accumu-

lation of complaints against him. The final accusation was that before witnesses he had called a worker by a very foul name and threatened to whip him "all over this cloth room." Since the second hand had previously given trouble, he was dismissed.

Color Discrimination Resented

ANOTHER second hand, Mr. Raeburn, resigned rather than discuss the several complaints filed against him. His resignation was accepted. An interesting detail of this case was that the shop committee decided in favor of a Negro scrub woman rather than the second hand. The chairman of the committee reported that the scrub woman, Cecilia Joslyn, had been accused of smelling so bad that some of the help had complained, and that two of the committee had been called to the second hand's office to smell her. One of the men had refused to comment; the other had said "he thought she smelled good considering the job she had to run."

The second hand, however, had told the woman she "stunk so bad nobody couldn't stand her." Raeburn's nose apparently was more sensitive than the others for the chairman concluded his complaint against his boss by saying he "hadn't heard anyone say she smelled bad except Mr. Raeburn." The shop committee thus refused to allow even Negro scrub-women to be abused by petty officials.

Swearing Disliked

A COMMON complaint against the bosses was their use of profanity when giving orders or reprimanding a worker. Though they may have known the words, the workers did not care to have such words used against them. A second hand, for example, was suspended for one week because, read the complaint, "We was in the big alley before work time Mr. Johnson walked up and said every —— —— one of you get on your Job and tend your own —— business." In announcing the suspension the overseer observed that "the use of profanity is unnecessary in any case and the help is entitled to the same degree of respect from the second hands that they expect from the help."

Complaints about Superintendents

EVEN the superintendent did not escape the complaints of the workers. His was an offense of which several others had been accused, namely, refusal to "go down the line," *viz* cooperate with the union. In one case every member of the local union signed the statement accusing the superintendent of "agitating some strife." No record is available in this instance of the outcome of this complaint.

From time to time workers complained that their bosses were not properly attending to their work. The painters, for example, accused their boss of wasting the company's money by not keeping them busy. "We are not going to set down," they wrote, "and let you throw the puppy in our laps and discharge us for something that you are to blame for." The accused offered explanations and the promise to do better.

Another boss was accused of spending too much time supervising one woman. "He has been seen," ran the statement, "in this woman's allie 5 or 6 times in one night, as much as 15 minutes at a time; also has been seen giving her a cocola." The committee felt that such actions seriously affected the peace and harmony of the department.

Workers complained not only against their bosses but also against their fellow workers. During the fifteen month period under consideration, forty-eight such letters were filed, half of them accusing fellow workers of not doing satisfactory work, and half of them involving personal disputes.

Complaints about Fellow Workers

IT IS difficult to decide whether the accusations that workers were not doing their jobs arose from an attempt at union-management cooperation or whether personalities entered into the matter. In all such cases, however, the management, through the overseers, accepted the recommendations of the shop committees. Mary Beson, for example, was accused of not being able to "run her job." "She has," read the complaint, "from eight to ten looms stopped all the time." The committee's recommendation that she be discharged was accepted by the overseer.

Most of these complaints dealt with minor infractions of working rules or with accusations that another worker was not doing his share, thus making it harder for the complainant. In either instance the guilty party was suspended for a period commensurate with the offense or warned that work must be improved. Occasionally a second hand would use the complaint procedure to help his own discipline problems. Two women spinners, for instance, were accused of slacking on the job. "I even have to whistle them out of the hydrant or send for them," complained the boss. The overseer gave both women indefinite layoffs. Even such complaints, however, were sent through the regular shop committee procedure.

The twenty-four personal complaints dealt with many subjects. The shop committees complained that a fellow employee had come to work drunk, or that one of their fellows had been stealing, or taking advantage of another in some other way. One girl had had an altercation with a man in the card room over the amount of his bill for drinks. The settlement in this last case was typical of those made of these interworking arguments.

The dispute was investigated; the complainant was found to be in the right; the defendant was given the choice of apologizing for using abusive language in the presence of a lady or of being discharged; he chose the latter. In some cases no choice was given, the defendant being suspended for an appropriate number of days.

Arguments over Union Membership

SURPRISINGLY few were the arguments over union membership, either because most of the workers belonged, or because of the agreement that union organization would not be discussed during working hours. Two such complaints, considered

as a unit by the management, illustrate some of the hard feelings generated during a unionization campaign and also a sensible way of handling a trying situation.

Greenwald, when asked why he didn't join the union, replied that there were several reasons, one of which was that the union never did anything. On another occasion he remarked that it made him so mad for anyone to say anything to him about joining the union that he could hardly stand it.

In another room Powell had been "making remarks and cussing the people and the union." He was accused of saying that "there wasnt nothing to the union people but a bunch of radical fools" and that any man that belonged "to the union wasent any better than a yellow dog." Then followed fighting words. The accused called one of the union men "out of his name" and claimed that "the union was rusha Red and that it wasent American Ism. It was got up by a bunch of reds and dogs and it ant no good for a man to belong to."

No Union Activity on Company Time

THE management settled this situation with very little disturbance. Union members were reminded that according to agreement "all union activities were to be carried on outside the fence except such activities as were necessary for the handling of complaints in the departments." "With the above in mind," concluded the management, "it would seem that Powell and Greenwald were not entirely to blame in that they were approached and talked with while at work." The company promised to explain to these men, however, that they were to stop causing trouble with their conversation; at the same time union members were urged to remember their pledge concerning union activity during working hours.

All of these personal difficulties well illustrate the type of dispute which, when brought to the surface, can easily be settled with a minimum of hard feelings but which, if allowed to smolder, would probably have upset labor relations and resulted in decreased production.

Villagers Have First Choice of Jobs

A RELATED group of twenty-five complaints dealt with infringement of working rules. One such rule was that when workers were needed those living in the village were to have first choice. The grievance committee studied the matter and recommended that ninety days' residence in the village be required before an individual might be considered for work in the plant.

If no village worker were available, the management might hire from any available source. The committee's recommendation was accepted by the management, and only in seven cases was the complaint made that an outsider had been hired when a villager had been available. Apparently in none of these instances was the management attempting to circumvent the rule, for when the error was noted the person in question was discharged.

Another working rule in the original agreement was that persons not reporting for work and failing to notify their boss were subject to punishment by suspension. During the course of the fifteen months, seventeen instances arose in which this rule had been disobeyed. In all but one of these the workers was penalized by one week of layoff for each day he was absent without excuse. The exception was a worker who had a sick child with whom she had stayed up all night, and both the shop committee and the management agreed this was a legitimate excuse.

Union Aids Absenteeism Curb

CLEARLY this rule against absenteeism was a management rule, passed in an effort to regularize attendance. The union, nevertheless, made the rule its own and sought to obtain uniform enforcement. Although realizing it was a company rule they were enforcing, union officials none the less saw in it a reasonable restraint particularly when many names were on the extra boards, *viz*, lists of possible workers.

This attitude was well expressed in a complaint filed against J. S. Cras. "He does not work half of his time," complained the committee. "He has not a reasonable excuse for being off so much. We the committee recommend that his job be given to some one who wants to work. We think that he should be put at the bottom of the spare board."

The management in enforcing this rule went so far as to ask the general shop committee and the grievance committee to formulate general regulations for absence from work. This the men did, and regulations were posted in the plant. No better illustration could be found of union-management cooperation for enforcing a rule which both helped union members on the spare board, and certainly aided the management.

One other type of self-discipline was found among the complaints. As in any mill where large numbers of men are employed, a certain amount of "horse play" took place. Ordinarily this is condemned by the foremen and the culprits are punished. In this plant, however, the shop committee asked the overseer to cooperate "in eliminating any act playful or any other way that would tend to promote any injury." The overseer agreed to cooperate by posting a notice on the bulletin board that under penalty no playing would be allowed in the room.

Few Wage Complaints

INTERESTINGLY enough, during the fifteen month period, only twenty-five complaints were made about wages. This small number was probably because of an understanding, made when the mill reopened after the strike, that requests of individuals or groups for increases in pay would not be considered until the Company could make adjustments in rates for all employees. With one exception, which the company on the above grounds refused to consider, complaints about wages

concerned inconsistencies in wages and did not involve general or individual increases.

Mr. Yellen's complaint is typical of the type of maladjustments corrected through the action of shop committees. He wrote saying, "You all paid him (another worker) $18.40 and have got me on the same Job and paying me $17.40. So I think I ort to git the same as he was gitting as I am doing the same work he done." He was granted an increase in pay.

Others based their complaints not on what fellow workers were being paid but on the fact that their particular working conditions made it impossible for them to "make out." Mrs. Jones, for example, asked that "this corse work be removed or have the price of hank adjusted fair." "This work is heavier," she said, "that there is more work to do on the Frame than there was on Fine Roving and I think I should have more per hank than I get on the fine frame." This particular request was not granted, but with this and similar complaints the important point was the detailed explanation of the decision given by the management.

Idle Time and Work Assignments

An interesting series of cases concerned procedure when a machine was idle through no fault of the operator, the question which arose being whether the operator should be paid for such idle time. After one second hand had paid a woman for the time, others immediately sought the same privilege. The shop committees and the management agreed that for an ordinary break down no payment need be made the idle workers, and that Mr. Jeffries, the second hand, should reimburse the company the eighty-five cents extra he had mistakenly approved.

The final group of sixty-one complaints to be considered have been classified perhaps somewhat arbitrarily as dealing with working conditions. Typical of sixty-one complaints about working conditions were seven identical letters from the second shift drawing frame operators. "We think that you are putting to much cleaning up on us to do," they wrote. "We want one hour to clean up on Friday or else have part of the cleaning up taken off of us. We do not have time to run our jobs and clean them up to."

Typical also was the disposition of the complaint made by the shop committee with the concurrence of the management. The hands on the first shift were to be required to "clean the rocker arms and the weights each Friday in addition to the other usual cleaning that they have been doing heretofore." In this way, read the report, the cleaning work can be more evenly divided.

Stretch-out Fears

Since textile operators during this period were constantly worried by the possibility of the imposition of a stretch-out system, several of the complaints about work referred to these fears. The workers in one instance asked that the speed of two

motors be reduced. The disposition of this complaint was the overseer's decision to have the motors checked by the mechanical department.

In another case the checkers, press men and doffers complained that "an unfair precedence has been established by starting a stretch out system in the cloth room." To this the overseer replied that "The checkers, press men and doffers work will not be increased any. They will still follow the same routine of work."

A third general type of work complaint dealt with the distribution of labor between shifts. The shop committee in the first shift spinning brought to the attention of the overseer the letter of Helen Marcy. "The spinners on the third shift," she wrote, "make a practice of leaving my sides stuck up they fail to do any cleaning off at all. This morning the sides were completely covered with cotton and stuck up so bad, I had to stop the frames and clean them off before I could run them." In answer the overseer explained that there was new help on the third shift, but that in his opinion "such conditions as had been complained of would be remedied within a few days."

Who Should Do the Job?

On several occasions, at least, workers complained of the type of work given them to do. They felt that a spinner should not have to do doffer's work, or a doffer a sweeper's task. In one case men in the machine shop made several such complaints. They thought there should be a plumber inside the mill, for "We dont think it is giving us justice to have machinist's to do pipe work." This feeling was not a result of a jurisdictional dispute such as might be aroused in a unionized building project. The machinists merely felt they had enough to do and that the pipe fitter never helped them with any of their work.

The other complaint of these men not only illustrates division of labor according to skills but also according to race. Apparently not sure that they would be relieved of plumbers' work, the machinists concluded their complaint letter as follows: "We think unstopping Toilets is out of a White Man's Class of Work, it ought to be done by Negros. You would not unstop Toilets Your Self. You should have the same Respect for your Employees You have for Your Self." In this particular case no indication was given on the report as to the disposition.

Why Give a Written Test as a Preliminary Eliminating Examination for Practical Jobs? It May be Better and Cheaper to Give a Short Practical Test of Key Skills Required in the Job First, and, if Necessary, Give the Written Test Last.

Practical Civil Service Examinations

By Harold Levine
New York, N. Y.

The written test has not been constructed which can measure adequately the skill of a craftsman at his trade. Yet in civil service examinations for a skilled job, a written test is generally administered as a first eliminating step. Those who survive are permitted to take a practical test which is a miniature replica of the job itself, and which is conceded to be at present the only one capable of measuring accurately the skills acquired in the plying of a trade.

There is no assurance, however, that by the first step in this eliminative process, the best mechanics are not themselves eliminated. In fact, one may suspect that the cream of the crop are those who have had least opportunity for academic schooling, and consequently are at a loss in written examinations, even the most simple. This is not to maintain that the written tests are academic and far removed from the duties of the position for which the examination is being held. The trouble is that linguistic facility is inherent in a written test. Only recently, a candidate for the job of Cement Mason in New York City wrote on his examination paper as he withdrew from the test, "I work with my hands, not with my mouth."

Why Written Tests for Practical Jobs?

Why, therefore, in view of the almost universal recognition of the invalidity of a written paper as a measure of ability to perform at a skilled trade is a written examination given at all? The answer to this has already been intimated in the opening paragraph which mentioned the eliminating feature of the written test. Due to the relatively costly processes in administering a performance test, it

has been considered advisable to reduce to a minimum the number of candidates qualified to take this practical examination. This cost is due to the machines involved, the materials needed, and, most important, to the small number that can be tested per examiner per day. These difficulties have sanctioned use of a testing device which is manifestly not a true testing tool at all.

Were it possible to reduce this overhead appreciably, the basis for the use of the written test for skilled jobs would be removed. The phase of overhead lending itself most readily to paring is the length of time needed to test each candidate, thus increasing the number capable of examination by an examiner in a given period. It is this aspect of the testing technique which now offers promise.

Each Job Has Few Key Skills

Most manual jobs in skilled trades require a certain finite number of specific essential skills without which a mechanic cannot succeed at a particular line of endeavor. These essential skills can be tested for much more quickly than can the entire process. Thus, a calculating machine operator must be able to add with reasonable facility. Hence one skill which can be tested for is the ability to obtain on the machine the sum of a column of figures. An examiner with a knowledge of the calculating machine operations can tell at a glance if the operator is skilled or not. In a space of a few minutes a candidate can be marked qualified or not qualified to take the more complete practical test. This latter is the more thorough and conclusive test given at present to those successful in passing a written examination.

Preliminary Key Skill Tests Advocated

If, therefore, an essential-skill test were administered as a first eliminating device there would be no danger of preventing any really competent and qualified craftsmen from competing in the complete practical examination. The basic assumption underlying the use of an essential-skill is that a good craftsman would certainly possess it and undoubtedly prove it. As a corollary is the less important fact (from the aspect of the establishment of the most qualified list) that those less skillful would probably not possess it and, hence, time would not be wasted on them in a longer practical test.

It must be carefully stressed that a short essential-skill practical test is not a substitute for the all-inclusive practical test as administered in civil service jurisdictions. It does, however, take the place of the written test. Both the essential-skill and the written serve the same purpose: to reduce the number of candidates to be tested further; but the one would look and be in line with the job, the other is at best a poor imitation.

The problem, therefore, resolves itself into two parts: (1) What are the essential-skills of any particular trade? (2) What would it cost to administer an essential skill test?

Both aspects require further research to determine the exact nature of their answers, but in general these observations may be made: 1. Every trade is capable of analysis into the basic elements which in combination form the complexity labeled "skilled trade". In some instances these elements are simpler to determine and easier to set up in a testing pattern, but the difference is one of degree. 2. The cost of the essential-skill test and the time involved would be much smaller than the cost and time for an all-inclusive practical test. The exact figures would vary from trade to trade. 3. From the standpoint of efficient civil service practice, the questions of time and cost are secondary, once these have been reduced appreciably, and are of the same order as the time and cost for written examinations.

Examination for Accompanist

THE writer was involved in an examination for Accompanist for Station WNYC, the municipal broadcasting station for New York City. Some 323 applicants filed applications for this job, and 260 took the written test which was given first. The rating of the hundredth candidate in the order of comparative scores was considered the pass mark, and all those achieving this mark or higher were eligible for the practical test.

As an inclusive test for accompanying involving instrumental ensemble playing, vocal accompaniment, the mastery of various techniques as transposing, improvising, and the accompanying of both classical and popular compositions, the adequate examining of which required at least a half hour per candidate, it was decided to hold an eliminating practical testing solo performance.

In both accompanying and solo performance certain essential skills are common; since accompanying requires the presence of subjects to be accompanied, it is considerably less costly to test an essential skill common to both through solo performance. Due to the fact that but a hundred candidates were eligible for this part, the solo test consisted of the playing of a prepared selection as well as three readings at sight of modern manuscript compositions, thus combining two essential skills.

Key Skill Test Described

EACH candidate performed for a maximum of eleven minutes. All the candidates were examined in seven evenings but if one essential skill alone had been tested, almost twice as many could have been examined in the same period. In the complex skill called accompanying, one essential element is the ability to read at sight the most difficult compositions. Allowing one minute for warmup, three minutes for performance and one minute for conference between examiners there is a total of five minutes devoted to the testing of candidate's ability as a sight reader. Actually, in the examination two minutes were allowed for warming up, five minutes were spent in playing the prepared selection, six minutes were devoted to sight reading, and a half-minute was spent in discussion, for it was found that a candidate's ability as a sight reader was manifested after several bars of music had been performed.

Consequently, on the basis of the seven sessions devoted to the testing of 100 candidates, about 23 sessions would have sufficed for the 323 who were eligible to take the written test. If the minimum of sight-reading only had been given the 100 candidates, about 4 sessions would have been sufficient; for the entire group of 323, therefore, about 13 sessions would have been required to separate the proficient technicians from those less proficient without the intermediary step of a written elimination test.

It required 67 examiner-man-days to prepare, administer, and rate the written test for the 323 candidates (calculated on the basis of the 260 candidates who actually took the written test). A total of 15 monitor days was needed to administer the test. As a result of this written test, 100 candidates were qualified to take the first practical test in solo performance. Had this short practical test been given to all 323 candidates as a first test, a total of 26 examiner-man-days and 39 monitor-days would have been expended.

Evidently the time involved would have been of the same order whether the written test or the essential skill test had been given first.

Written Test Should Be Last

In the case of this particular examination, a written test would have had to be given, for the duties called for the arranging of musical programs for dramatization. The inclusion of this duty, however, goes beyond the skilled function of accompanying. (As a matter of fact, what was wanted for the position in question was not an accompanist but an all-round musician with technical facility in piano performance.) In any event, the written test would have been given to the twenty-five best technicians rather than a practical to the hundred best theoreticians as was actually done.

Moreover, even in this latter instance, it would have been preferable even from the financial aspect to hold this written examination after the practical test. Assuming that the time spent in the construction of the written test, and the preparation of the key would have been the same regardless of the size of the group taking the test, the number of examiner-man-days to rate 25 papers instead of 323 would have been reduced from 45 to about 4. The additional number of examiner-man-days required to hold the eliminating practical for the 223 candidates who were eliminated by the written is 9. Hence on this estimate alone, 32 more examiner-man-days were spent in administering as a first test an eliminating written examination, rather than a short performance test.

The conclusion to be drawn from this comparison may be stated as follows: In holding an examination for a job requiring manual dexterity, like Accompanist, it would not only be more valid to hold an eliminating essential-skill practical first, to be followed by an exhaustive practical, and finally if necessary by a written test to the survivors, but it would be less expensive than reversing this order to give the written test first.

Shortening Total Examination Time

It does not follow from these figures that administering an essential-skill practical test first instead of a written would reduce the cost of the examination. In the illustration discussed above a reduction would have been realized. Each skilled trade however would in turn require its own analysis. But, the total span of time between the beginning and end of an examination in a skilled trade would in general be considerably less if an essential-skill practical were given first than if a written test were administered first. The Accompanist examination covered a period of six months, four months of which were devoted to the written test. Without the written, or with a written for the successful candidates in the complete practical, two months would have been more than enough.

It should be noted in passing that the final list established for the position of Accompanist contained twenty-seven names, most of whom were remarkably fine technicians. But there is no way of knowing how much finer technicians may have been eliminated by the written test, and consequently never were examined on their technical mastery of piano playing. An analysis of the rank correlation between the scores on the written test and the results on the practical test in solo performance showed a value of 0.25 which has little predictive significance.

Objections to Short Test

The question might be raised that the public, and certainly the candidates would object to an in-out practical. They would claim that a fair opportunity was not given them to demonstrate their technique. But this imagined hue and cry cannot compare with that raised by candidates who are eliminated by the written and never are permitted to compete in the practical. Furthermore, public opinion as to the value of the written examination for practical jobs is certainly not favorable.

The only reason for the acceptance of this written device is the plea that funds are not available to cope with the vast number of applicants. Hitherto the written test has been considered a necessary evil. It is suggested here that this evil may now have become unnecessary. Incidentally, no unduly elaborate publicity campaign would be needed to educate the public to the proposed scheme.

Another possible argument against the use of the essential-skill practical is that if this elimination test covers any appreciable period, the later candidates could benefit by the process. This assumes that an unskilled applicant could become skilled in several days or weeks. The fallacy of this argument for any skilled job is obvious. However, even the slightest possibility of this can be eliminated, for different essential-skill practicals could be given at different sessions. There are certainly sufficient basic skills for most jobs to cover weeks of testing. If there are not, a minimum of these skills in combination might be attempted. For five essential skills, a combination of any two yields ten different varieties.

How to Make a Key Skill Test

In order to test the validity of this new procedure, it is necessary to determine the essential skills for each job, and to select those which correlate best with the final performance. It is true that most if not all the basic skills being essential to the complete performance should correlate highly with it. Statistically, however, it is conceivable that some correlate more highly than others. For the purpose of eliminating the poorer mechanics these are preferable for the essential-skill test.

In the New York City Civil Service Commission, there is available a body of data which enables the selection of these elements to be achieved. Most practical examination rating sheets are themselves divided into various elements making up the total process, each one of which is rated separately and all of them in various weighted combinations making up the final result. The grades on each of these elements, if a basic process is easily and quickly demonstrable, could be correlated with the final grades, and those showing the highest correlation would then each form the eliminative process determining those eligible for the lengthy complete practical. If the data do not lend itself to this analysis, future examinations might be framed with this in mind so that if the selection of these elements cannot be determined, or if it is found not feasible to introduce this procedure immediately, the basis for its introduction may be laid.

Dr. Millis' Views on Hours

National Labor Relations Board
Washington, D. C.
March 4, 1941

Editor,
Personnel Journal

Dear Sir,

In your article on "Social Changes 1941 and After" in the December issue of the Personnel Journal I am quoted as saying that "if necessary in the interests of defense, restrictions on hours of labor in America might be removed, so that workers could work 10 or 12 hours a day". This statement does not at all represent my views. In fact I am in accord with your subsequent remarks on the dangers of increasing working hours to the point where fatigue begins to cut down efficiency, and I regret that the misquotation of my views in a newspaper interview lead you to cite this misstatement.

On November 18, 1940, James Doherty of the Chicago Tribune interviewed me and began his signed statement with this paragraph:

> "Defense measures need not necessarily increase the working hours of the laboring man, but if an emergency requires a 10 or 12 hour day American men should be willing to do their part."

This supposed expression of my opinion so distressed me that I at once attempted to correct the impression by stating my true views to a reporter from the United Press. By this United Press reporter I was correctly quoted in a dispatch from Chicago, also on November 18, 1940, containing this quotation:

> "I am opposed to increasing the working week beyond 40 hours without careful consideration of three factors: working conditions, type of work, and type of employee."

In this same article the writer correctly expressed my views in this paragraph:

> "He expressed the belief that a 50-hour work week would, in many cases, decrease output because of fatigue. Under ordinary circumstances, he said, 40 hours a week is long enough for any person to work."

I would consider it a great favor on your part if you could devise some opportunity to correct in the minds of your readers the impression left by your assumption that the Chicago Tribune article was an accurate presentation of my views.

(Signed) H. A. Millis, *Chairman*.